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मानक

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“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 3829-1 (1999): Horizontal Cylindrical and Horizontal Rectangular Steam Sterilizers, Pressure Type (for Hospital and Pharmaceutical Use) [MHD 14: Hospital Planning]



“ज्ञान से एक नये भारत का निर्माण”

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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

भाप चालित कीटाणुनाशक यंत्र

भाग 1 समतल बेलनाकार एवं समतल आयताकार कीटाणुनाशक यंत्र, दबाव युक्त
(अस्पताल एवं औषधिनिर्माण में उपयुक्त)

(दूसरा पुनरीक्षण)

Indian Standard

SPECIFICATION FOR STEAM STERILIZERS

PART 1 HORIZONTAL CYLINDRICAL AND HORIZONTAL RECTANGULAR
STEAM STERILIZERS, PRESSURE TYPE (FOR HOSPITAL AND PHARMACEUTICAL USE)

(Second Revision)

ICS 11.040.30

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (Part 1) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Hospital Equipment Sectional Committee had been approved by the Medical Equipment and Hospital Planning Division Council.

This standard was first published in 1967 and was subsequently revised in 1978. The second revision of this standard is brought out keeping in view the latest developments in the manufacture of pressure type horizontal cylindrical and horizontal rectangular steam sterilizers (for hospital and pharmaceutical use). The revised standard incorporates reference to the latest Indian Standards for materials used for manufacture of doors, chambers of the sterilizers. This revision also takes into account the five amendments issued to this standard from time to time.

It is suggested that tap water, reasonably free from scale-forming constituents should be used for steam generation. If the water is hard it should be treated before it is used for steam raising [see IS 1680 : 1982 Code of practice for treatment of water for low and medium pressure land boilers (third revision)].

The problem of explosion risk arising from fumes of anaesthetic agents have not been taken into consideration on the understanding, that all types of sterilizers dealt with in this standard would be installed generally remote from the anaesthetizing area in the operation theatre, and that the anaesthetic room would be outside the zone of explosion risk. Installation of these sterilizers is not recommended in an operation theatre.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***SPECIFICATION FOR STEAM STERILIZERS****PART 1 HORIZONTAL CYLINDRICAL AND -HORIZONTAL RECTANGULAR
STEAM STERILIZERS, PRESSURE TYPE (FOR HOSPITAL AND PHARMACEUTICAL USE)***(Second Revision)***1 SCOPE**

This standard specifies requirements for non-automatic, automatic process control or pulsing type pressure steam sterilizers of horizontal cylindrical and horizontal rectangular type designed for a working pressure of 126 kN/m² (1.26 kgf/cm² approx) gauge but shall be set to operate at 105 + 15 kN/m² (1.05 + 0.15 kgf/cm² approx) gauge pressure (corresponding temperature of the saturated steam inside the chamber about 121°C).

2 REFERENCES

The Indian Standards given in Annex A contain provisions which, through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

3 TERMINOLOGY**3.1 Sterilizer**

For the purpose of this standard, the sterilizer shall mean a steam pressure appliance used for the destruction of bacteria and related organisms.

4 DESIGN

4.1 The sterilizer shall consist of a chamber, with an annular steam jacket on the sides. The chamber shall have a door at one end or both ends, as specified by the purchaser.

4.2 The sterilizer shall be designed to operate on direct steam from a central source or by means of an attached steam generator (boiler) heated by electricity or kerosine stoves or gas or a combination of these (see 10.7), subject to the purchaser selecting one or the other of the heating arrangement.

4.3 The sterilizer shall be capable of performing the following operations constituting one full cycle of sterilization:

- a) Generate steam and build up working pressure in the jacket, without admitting it to the chamber;
- b) Admit steam to the chamber and allow it to build up to working pressure and temperature (maintaining the pressure in the jacket) and retaining the working temperature for at least 2 h;
- c) Exhausting the chamber pressure, retaining the jacket pressure; and
- d) Drying of load in chamber (if required) through the circulation of dry, filtered air entering through a drying system as specified in 8.i.5.

5 SHAPE AND SIZE**5.1 Shape**

Sterilizers shall have a circular, square or rectangular cross section forming the main receptacle.

5.2 Size

The size of a sterilizer shall be determined by the size of the inside of the chamber, preferably conforming to Tables 1 and 2 read with Fig. 1 and 2. Other sizes of the sterilizers are also allowed as agreed between the purchaser and the manufacturer provided the performance tests and other requirements of this standard are fulfilled by the sterilizers.

NOTE — Sizes are determined by the size of the dressing drums and the standard sizes of sheets rolled by steel mills.

6 MATERIAL

6.1 Various components of the sterilizers shall be fabricated from combinations of materials given in Annex B. The recommended uses of the sterilizers depending on the combination of materials are also given in Annex B. The sterilizers, in addition, shall satisfy the requirements specified in 6.2 to 6.4.

6.2 Where the sterilizer is designed specifically for bottled fluids, such as saline or other corrosive solutions, the combinations of materials as shown at Sl No. (i), (ii), (iii) in B-1 under chamber and jacket shall be used. The purchaser shall notify the manufacturer of particulars of such solutions at the time of tendering.

6.3 When the seams and pipe connections are soldered or brazed it shall be done with oxy-acetylene, oxy-propane, air-acetylene or air-propane flame.

6.4 In stainless steel sterilizers all joints shall be welded by argon-arc process or with appropriate flux coated electrodes.

Table 1 Dimensions of Horizontal Cylindrical Sterilizers
(Clauses 5.2 and 10.4)

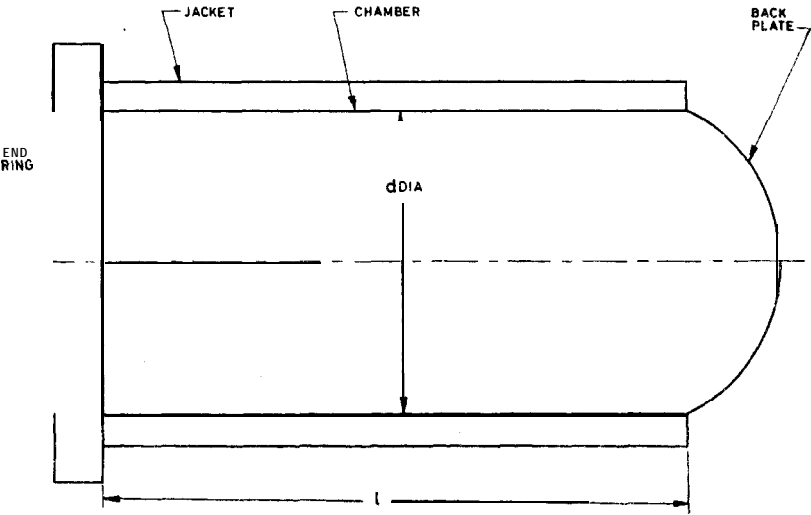
Diameter (d)	Length (l)
(1)	(2)
mm	mm
400	600
400	1 100
500	900
500	1 100
750	1 100

6.5 Piping

All piping shall be from non-corrosive materials like, stainless steel, brass, copper, etc. Brass or copper piping shall be seamless or brazed as required by the purchaser. Piping of stainless steel or clad material may have a welded seam.

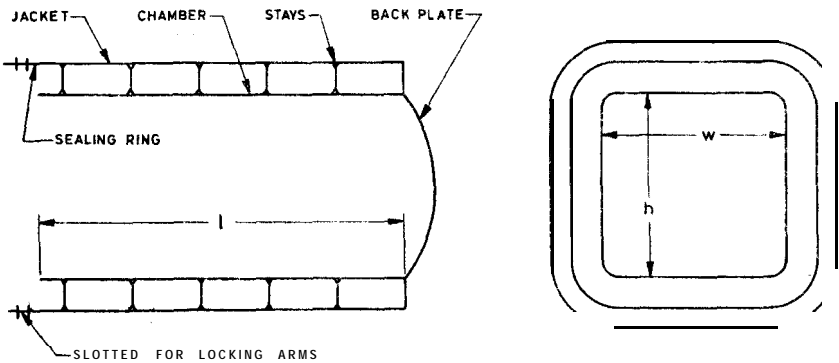
Table 2 Dimensions of Horizontal Square or Horizontal Rectangular Sterilizers
(Clauses 5.2 and 10.4)

Width(w)	Height (h)	Length (l)
(1)	(2)	(3)
mm	mm	mm
600	600	1 200
600	900	1 500
900	1 050	2 100
1 050	1 200	2 100



All joints welded.

FIG. 1 STERILIZER, CYLINDRICAL



All joints welded.

FIG. 2 STERILIZER, RECTANGULAR

7 CONSTRUCTION

7.1 The sterilizers shall consist of a chamber with a steam jacket. The chamber shall have door at one or both ends, as specified by the purchaser. The joints in the shell (chamber, jacket, back plate, if any, and end ring) shall be fusion welded.

7.2 Shell

The general arrangement of the four items shall be as indicated in Fig. 1 and 2. The square or rectangular sterilizers shall have no end ring, but the jacket shall be extended and slotted or flapped inwards at 90° to receive the locking arms or members.

7.2.1 The number of sheets or plates required to form the chamber and jacket shall not exceed two each in case of cylindrical sterilizer and four in case of rectangular sterilizer. All seams shall be butt fusion welded (see IS 2825). When the shell is made from more than one width of plate, the longitudinal seams shall not fall in one line.

7.2.2 The back plate shall always be formed out of one sheet or plate.

7.2.3 In square or rectangular sterilizers there shall be no joint at the longitudinal bend.

7.2.4 Stays

The stays reinforcing the chamber and jacket in the case square or rectangular sterilizers shall be of 'T' section 50 mm x 50 mm x 5 mm. They shall be welded along the four sides of the shell, at a distance of not more than 200 mm from each other and the sealing ring and the back plate (see also Fig. 2). The length of the stay shall be about 75 percent of the side to which it is welded, to allow space for steam circulation. The material of the stays shall be the same as that of the jacket.

7.2.4.1 The vertical section of 'T' shall be welded on both sides, on to the chambers. The jacket sides shall be slotted suitably at 200 mm distance, centre to centre, and the horizontal section of the 'T' shall be welded to the jacket through these slots.

7.2.5 Corners shall be well rounded with a radius of curvature ranging between 90 and 140 mm depending on the size and design. The radius of curvature of the corners of the jacket shall be chosen to suit that of the chamber.

7.2.6 Each shell shall have at least the following connectors welded:

- a) One for operating valve,
- b) One for safety valve,
- c) Two for steam inlet (in case the steam

generator is attached to the sterilizer),

- d) One for chamber drain,
- e) One for steam inlet to chamber,
- f) One for vacuum drier, and
- g) One for validation for chamber.

7.2.6.1 The material of the connector shall be the same as that of the member of shell to which it is welded. When clad material is used for the chamber, the connector shall be of the same material as the cladding.

7.2.7 All outer surfaces of the jacket shall be suitably insulated (lagged), Further the insulation shall be covered suitably.

7.3 Door

The door shall be fitted on one side of the shell and open sideways normally to the right side, facing the sterilizer unless otherwise specified by the purchaser. In the case of double door sterilizers a door shall be fitted to either end, The doors shall, in such case be fitted to open on the right side at both ends, unless otherwise specified by the purchaser. With double door sterilizers there shall be no back plate, but an additional end ring in the case of cylindrical sterilizers and extension and sealing of the jacket in the case of square or rectangular sterilizers shall be provided. The inside portion when made of mild steel sheet shall have a thin coating of zinc metallizing (about 10 microns) or may be coated with heat resisting paint.

7.3.1 Locking Device

A door-locking device shall be so arranged that when opening and closing the door, the locking arms or members are fully engaged before gasket seal can be established to ensure effective sealing. The door shall lock positively when pressure in the chamber is 35 kN/m² (0.35 kgf/cm²) gauge or more and the lock shall not get released till the pressure falls below 35 kN/m² (0.35 kgf/cm²) gauge. Provision shall be made to tighten the door while in locked position. All square or rectangular sterilizers shall have an additional manual lock.

7.3.2 Door Gasket

It shall be one piece without joint, moulded of steam resistant, resilient material. Neoprene EPDM or Silicon rubber or equivalent shall be used for this purpose. It should be capable of effectively sealing the door against internal pressure up to the hydraulic test pressure. The gasket material shall be durable enough to withstand the working temperature over long periods.

7.3.3 Adjustment

All doors shall have a device capable of adjustment when misaligned.

8 FITTINGS

8.1 The following shall be provided on all sterilizers.

8.1.1 Operating Valve

All sterilizers below size 600 mm x 900 mm x 1 500 mm shall be provided with a multiport valve. All sterilizers of size 600 mm x 900 mm x 1 500 mm, its equivalent or above, may have multiport valve or any other type of valve. However in both the cases following cycle of sterilization shall be achieved:

- Preserving pressure in jacket without admitting it to chamber, till needed;
- Admitting steam to chamber, but maintaining the jacket pressure;
- Exhausting the chamber of steam but maintaining jacket pressure;
- Circulating dry, filtered air for drying but maintaining the jacket pressure; and
- Exhausting the jacket of steam.

8.1.1.1 The operating valve shall be located in the front part of the sterilizer and shall be easily accessible.

8.1.2 Exhaust Time

There shall be two speeds for exhausting the chamber:

- Up to 7 minutes, called 'fast exhaust' for dressing or unbottled loads; and
- Over 7 up to 30 minutes, called 'slow exhaust' for bottled loads or fluids.

8.1.3 Safety Valve

Where other means of controlling pressure are used, such as reducing valve for direct steam operation or pressure switch for electric operation or device for gas flame control, one spring loaded safety valve shall be provided to the jacket.

8.1.3.1 Where the safety valve also acts as relief valve to regulate the operating pressure, an additional safety valve, either spring or weight loaded, shall be provided. It shall be so constructed as to prevent an increase in the steam pressure of more than 10 percent of the pressure at which the relief valve is set to lift and it shall shut down at a pressure not more than 10 percent below the pressure at which the valve is set to life.

8.1.4 Vacuum Breaker

The jacket shall be provided with an automatic device to admit air to jacket in the event of formation of vacuum in the jacket due to steam condensation.

8.1.5 Drying System

The filter supplied with the drying system shall admit filtered air to the chamber and shall entrain vapours and odours to be conducted to exhaust. The filter supplied shall be of the ceramic labyrinth type with a maximum pore size of 50 μm or a cast column containing at least 15 g of tightly packed nickel-copper alloy wool, and equipped with a condensate drip device.

8.1.6 Baffle

For effective distribution of steam in the chamber a baffle of non-corrosive metal or a sprage pipe shall be fitted to distribute steam effectively throughout the chamber.

8.1.7 Chamber Drain

The sterilizer chamber shall be fitted with one or more chamber drain lines, for thorough evacuation of air and condensate from the chamber, during the steam exposure stage of the sterilizing cycle. Each drain line shall be fitted with a thermostatic steam trap and a check valve. The bore shall be such as to allow evacuation within 10 to 15 minutes of introduction of steam, except for bulk sterilizers.

8.1.7.1 Plug screen

The chamber end of the drain line shall have an easily removable plug screen to prevent large particles from entering the line.

8.1.7.2 Thermometer

The chamber drain line shall be fitted with a temperature measuring device which shall be mercury thermometer or dial type thermometer, before the check valve. The thermometer shall be readable from the front of the sterilizer. When a dial thermometer is provided the minimum diameter of the dial shall be 60 mm with an accuracy of $\pm 1.5^\circ\text{C}$ at any reading.

8.1.8 Gauges

All single door sterilizers shall be fitted with pressure gauge to indicate the jacket pressure and a compound pressure-vacuum gauge to indicate the pressure in the chamber. Both gauges shall be easily readable from the front of the sterilizer.

8.1.8.1 In double-door sterilizers an additional compound gauge shall be fitted to the chamber, and shall be easily readable when facing the other door from the other side of the sterilizer.

8.1.9 Automatic Process Control Unit and Recorder

If required by the purchaser, an automatic process control unit with temperature and/or pressure recorder may be provided to control the sterilization

cycle mentioned in 4.3 automatically with the option to carry out the process of sterilization manually if desired.

Additionally a pulsing cycle may also be incorporated to this process control to attain the following sequence of stages.

Stage I — Air Removal — Sufficient air shall be removed from the chamber after loading the sterilizer in one or more pressure/vacuum pulsing to permit proper steam penetration and quick attainment of the sterilization temperature.

Stage II — Sterilization — Steam shall be admitted to provide sterilizing conditions within the chamber load. The sterilizing condition shall be such that when the chamber is loaded, the mean temperature of 121°C is attained and maintained with tolerance of +2°C in the chamber for 15 min.

Provision may be made for alternate time temperature relationship in addition to the sterilizing conditions specified above.

Stage III — Drying — Steam shall be removed from the chamber and vacuum shall be held for a period normally not exceeding one hour.

Stage IV — Air Admission — Air shall be admitted into the chamber through a micro filter of approximately 5 micron size.

8.1.9.1 The above sterilization cycle shall satisfy an appropriate heat sensitive type test.

8.1.10 Temperature Control and Measurement

Provision should be made to incorporate one or more thermocouples in different zones of the chamber of the sterilizer in order to control and measure the temperature of the zone of the chamber.

9 HYDROSTATIC TEST

9.1 On completion of manufacture, the sterilizer chamber shall be subjected to a hydrostatic test of one and a half times and the sterilizer jacket to twice the working pressure.

9.1.1 The jacket shall be tested at atmospheric pressure in the chamber. The test pressure shall be maintained for not less than 20 min, during which time all the accessible parts shall be examined. There shall be no sign of leakage, sweating, weakness or permanent deformation.

9.2 The steam generating boiler shall be subjected to hydrostatic test of twice the working pressure of the sterilizer. Test pressure shall be maintained for not less than 20 min and during this time all the accessible

parts shall be examined. There shall be no sign of leakage, sweating, temporary or permanent deformation.

10 METHODS OF STEAM SUPPLY TO STERILIZERS

10.1 Source of Supply

Steam shall be supplied to sterilizers either directly from a steam boiler of the establishment or from a built-in steam generator, as specified by the purchaser. In the latter case, the steam generator may be heated either electrically or by kerosine stoves or by gas. Rectangular sterilizers of sizes 900 mm x 1050 mm x 2100 mm and 1050 mm x 1200 mm x 2100 mm, shall be available for direct steam operation only.

10.2 Direct Steam Operation

When steam is supplied directly from a steam boiler of the establishment, the steam shall first enter the steam jacket through a suitable steam-strainer pressure-reducing valve. The reducing valve shall be adjusted for an inlet gauge pressure of minimum 280 (2.8 cm² approx) and outlet gauge pressure of 105 to 120 kN/m² (1.05 to 1.2 kgf/cm² approx). A stop valve, to shut off steam supply to jacket shall be provided.

10.2.1 The jacket shall have one or more steam traps at the bottom to drain the condensate.

10.3 Built-in Steam Generator

This steam generator shall be attached to the underside of the shell, with two steam inlet pipes to the jacket. These inlet pipes may also act as supports for the steam generator. It shall be easily disconnected for cleaning. It shall be cylindrical in construction and all joints shall be butt fusion welded in accordance with best practice of welding for pressure vessels.

10.3.1 All steam generators shall be provided with a gauge glass of wall thickness at least 1 mm to indicate water level and self-locking gauge glass valves.

10.4 Electric Heating

Where the steam generator is electrically heated, it shall be by immersion heaters, wired for operation on 3-phase 4 wire, 400/440 V, 50 Hz ac supply or any other supply, if specifically required by the purchaser. The electric load for various sizes of sterilizers given in Tables 1 and 2 shall be as follows:

a) *For Horizontal Cylindrical Sterilizers*

Sizes		Load kW
Dia	Length	
mm	mm	
400	600	6
400	1 100	9
500	900	9
500	1 100	9
750	1 100	18

b) *For Horizontal-Square or Horizontal Rectangular Sterilizers*

Sizes			Load kW
Width	Height	Length	
mm	mm	mm	
600	600	1 200	18
600	900	1 500	36

The heaters shall be easily accessible. A switch shall be provided on the control panel to isolate the heater from the mains.

10.4.1 *Low Water Protection*

In case of electrically heated boilers, a low water protection for heaters shall be provided, to cut off electric supply to heaters through a contactor if the water level runs below the heater level.

10.4.2 *Pressure Control*

Working pressure, in the case of electrically heated sterilizers, should preferably be controlled through a pressure switch connected preferably to the steam generator or to the jacket but not to the chamber.

10.4.3 *Switch Box*

The contactor, switches and pilot lights shall be located in one box, mounted on the stand of the sterilizer.

10.5 *Stove Heating*

The steam generator specified in 10.3, shall have suitable kerosine burners underneath. The burners shall be kerosine fired through a pressure-kerosine tank.

10.5.1 The steam generator shall have suitable arrangements for protection against open flame.

10.6 *Gas Heating*

The steam generator shall be the same as for stove heating as in 10.5 but instead of kerosine burners suitable gas burners shall be provided.

10.7 *Combination Heating*

Sterilizers, when so specified, shall be supplied for

any of the following combination heating, operating independently:

- Direct steam/electric
- Direct steam/kerosine stove
- Direct steam/gas
- Electric/kerosine stove
- Electric/gas

In the last two cases, the electric wiring shall be suitably protected against heat from the burner flame.

10.8 *Capacity*

The capacity of the steam generator in any size of the sterilizer shall be sufficient to give two complete cycles of sterilization.

11 *ACCESSORIES*

11.1 When specified by the purchaser, the following accessories shall be provided.

11.1.1 *Loading Carriage and Trolley*

The carriage shall be suitable for loading the particular type or types of loads specified by the purchaser. The carriage shall roll on rails, fixed to the chamber. In the case of stainless steel chamber, the rails shall also be stainless steel.

11.1.1.1 The carriage shall roll in and roll out freely on a trolley mounted on robust wheels or castors or drop rails. The trolley shall have provision for locking the carriage and shall have arrangement to lock itself on the sterilizer during loading and unloading.

11.1.1.2 In case of stainless steel chamber the material of the carriage shall be the same as the material of the chamber. For mild steel sterilizers the carriage shall preferably be of stainless steel.

11.1.2 *Trays or Racks*

Trays or racks shall be provided in the chamber of the size, shape and material as agreed to between the purchaser and the manufacturer.

11.1.2.1 In case of racks for instruments, the rack shall contain a number of removable trays made of stainless steel.

11.1.3 *Thermograph*

All sterilizers shall have arrangement in the chamber drain line to fit a thermograph at any time. The thermograph when supplied may be operated electrically or by spring motor (mechanical).

11.1.3.1 The thermograph chart shall be graduated on the Celsius scale. The thermograph shall record temperature over a period of 24 h. Lock and key arrangement shall be provided on the door of the thermograph.

11.1.4 Flush Mounting

Sterilizers shall be arranged for installation through a wall to expose the door and the-necessary operating handles and instruments on one side. The rest of the sterilizer shall lie on the other side.

11.1.4.1 The sterilizer shall be provided with a panel as specified by the purchaser to be mounted in the front, flush with the wall.

11.1.4.2 All extended valve spindles shall be supported through metallic sleeves.

12 MARKING

12.1 Each sterilizer shall be legibly and indelibly marked with the following:

- a) Identification of the manufacturer;
- b) Code and serial number;
- c) Working pressure;
- d) Hydrostatic test pressure; and
- e) Wattage, voltage, phase and cycle in the case of electrically operated steam generators.

12.2 BIS Certification Marking

The sterilizer may also be marked with the Standard Mark.

12.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act 1986*, and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

13 OPERATED MANUAL

Each sterilizer shall be accompanied by an operating manual which shall contain the following information:

- a) Instructions and plan for installation of the sterilizer,
- b) Operation of the sterilizer,
- c) Routine maintenance and service,
- d) Steam penetration time for various packaged loads, and
- e) Materials used or combination of materials used for chamber and jacket.

14 PACKING

Each sterilizer shall be packed as agreed to between the manufacturer and the supplier.

ANNEX A

(Clause 2.1)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
306 : 1983	Tin bronze ingots and castings (<i>third revision</i>)	(Part 5) : 1992	Hexagon thin nuts (unchamfered) (size range M 1.6 to M63) (<i>third revision</i>)
318 : 1981	Leaded tin bronze ingots and castings (<i>second revision</i>)	2002 : 1992	Steel plates for pressure vessels for intermediate and high temperature service including boilers (<i>second revision</i>)
1364	Hexagon head bolts, screws and nuts product grades A and B	2041 : 1995	Steel plates for pressure vessels used at moderate and low temperature (<i>second revision</i>)
(Part 1) : 1992	Hexagon head bolts (size range M1.6 to M64) (<i>third revision</i>)	2825 : 1969	Code for unfired pressure vessels
(Part 2) : 1992	Hexagon head screws (size range M1.6 to M64) (<i>third revision</i>)	6911 : 1992	Stainless steel plate, sheet and strip (<i>first revision</i>)
(Part 3j) : 1992	Hexagon nuts (size range M1.6 to M64) (<i>third revision</i>)		
(Part 4) : 1992	Hexagon thin nuts (chamfered) (size range M1.6 to M64) (<i>third revision</i>)		

ANNEX B
(Clauses 6.1 and 6.2)

MATERIALS USED IN THE FABRICATION OF STERILIZERS

B-1 COMBINATIONS FOR CHAMBER AND JACKET AND RECOMMENDED USES STERILIZERS

<i>Sl No.</i>	<i>Chamber</i>		<i>Jacket</i>		<i>Recommended Use</i>
	<i>Material</i>	<i>Conforming to</i>	<i>Material</i>	<i>Confirming to</i>	
i)	Stainless steel	Designation X04Cr19Ni9 or 04Cr17Ni12Mo2 and of 2B finish in accordance with Table 8 of IS 6911	Stainless steel	Designation X04Cr19Ni9 and of 2B finish in accordance with Table 8 of IS 6911	Steel X04Cr19Ni9 for dressings, linen, and instruments; and steel 04Cr17Ni12Mo2 for crystalloids like saline
ii)	do	do	Mild steel plate	IS 2041	do
iii)	Mild steel plate	IS2041	do	do	For dressings and linen only

B-2 COMPONENTS

<i>Sl No.</i>	<i>Components</i>	<i>Material</i>	<i>Conforming to</i>
i)	Stays	Same as for the jacket	—
ii)	Precision hexagonal headed bolts, nuts and screws	—	IS 1364 (Parts 1 to 5)
iii)	Nuts and bolts	Stainless steel or Mild steel	Designation X07Cr18Ni9 or X04Cr19Ni9 of IS 6911 IS 2041
iv)	Door	Gun metal	IS 306 Grade 1 or 2 of IS 318
		Stainless steel Mild steel	Same as for the chamber IS 2041
v)	Door ring	Mild steel or Stainless steel	IS 2002 Same as for the chamber